ABSTRACT

A base-facilitated reformation reaction. Hydrogen is produced from a reaction of an organic substance with a base to form bicarbonate ion or carbonate ion as a by-product. The base-facilitated reformation reactions are thermodynamically more spontaneous than conventional reformation reactions and are able to produce hydrogen gas at less extreme reaction conditions than conventional reformation reactions. In one embodiment, the instant base-facilitated reactions produce hydrogen gas from an organic substance at a lower temperature than is possible for the production of hydrogen gas from the organic substance in a conventional reformation reaction. In another embodiment, the instant base-facilitated reformation reactions produce hydrogen gas from an organic substance at a faster rate at a particular temperature than is possible from the conventional reformation reaction of the organic substance. In yet another embodiment, a reformation reaction is made spontaneous in the liquid phase by running the reaction at an elevated pressure. The preferred organic substances of the instant invention are hydrocarbons having four or more carbon atoms per molecule or mixtures thereof that are available from fuels such as gasoline, bio-diesel, diesel or other petroleum distillates or by-products.